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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/926,494	02/11/2002	Ifor David William Samuel	P67265US0	6660

136 7590 03/02/2004

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EXAMINER	
HARPER, HOLLY R	
ART UNIT	**PAPER NUMBER**
2879	

DATE MAILED: 03/02/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	09/926,494	SAMUEL ET AL.	
	Examiner	Art Unit	
	Holly R. Harper	2879	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☐ Responsive to communication(s) filed on _____.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) 1-34 is/are pending in the application.

4a) Of the above claim(s) 31 and 32 is/are withdrawn from consideration.

5)☒ Claim(s) 33-34 is/are allowed.

6)☒ Claim(s) 1-30 is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on 03 November 2001 is/are: a)☐ accepted or b)☒ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. §§ 119 and 120

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☒ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

13)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application) since a specific reference was included in the first sentence of the specification or in an Application Data Sheet. 37 CFR 1.78.

a) ☐ The translation of the foreign language provisional application has been received.

14)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121 since a specific reference was included in the first sentence of the specification or in an Application Data Sheet. 37 CFR 1.78.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____.
4) ☐ Interview Summary (PTO-413) Paper No(s). _____.
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: .

DETAILED ACTION

Response to Amendment

The Amendment, filed on 11/26/03, has been entered and acknowledged by the Examiner.

Claims 33-34 have been entered.

Claims 1-15, 17, and 18 have been amended.

Claims 23-24 have been canceled.

The Specification has been amended.

The drawings have been amended.

Drawings

1. The drawings are objected to as failing to comply with 37 CFR 1.84(p)(5) because they include the following reference sign(s) not mentioned in the description: Elements 1-5 and "a" on Figures 3a and 3b are not described in the Specification. A proposed drawing correction, corrected drawings, or amendment to the specification to add the reference sign(s) in the description, are required in reply to the Office action to avoid abandonment of the application. The objection to the drawings will not be held in abeyance.

Claim Rejections - 35 USC § 103

2. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

3. Claims 1-17, and 20-22 are rejected under 35 U.S.C. 103(a) as being unpatentable over Barnes et al. (WO 98/25313).

In regard to claim 1, the Barnes reference discloses an LED (Figure 5 and Page 8, Lines 3-7) with a semiconductor layer (Figure 5, Element 55) and periodic microstructure means (Figure 5, Element 53). Because the LED has a sequence of layers on a substrate (Figure 5), the LED must have two electrodes, one adapted for electron injection and one adapted for hole injection, sandwiching the layer structure.

Regarding claim 1, the functional language "means for manipulating emission and/or propagation of light by coupling non-radiative waveguide-modes to far-field radiation" has not been given patentable weight because it is narrative in form. In order to be given patentable weight, a functional recitation must be expressed as a "means" for performing the specified function, as set forth in 35 U.S.C. § 112, 6th paragraph, and must be supported by recitation in the claim of sufficient structure to warrant the presence of the functional language.

In regard to claim 2, the recitation "configured to increase efficiency of emission by facilitating the coupling, at least in part to useful far-field radiation so recovering some of the energy that would otherwise have been lost to non-radiative waveguide-modes" has not been

given patentable weight because is considered an intended used recitation. It has been held that a recitation with respect to the manner in which a claimed apparatus is intended to be employed does not differentiate the claimed apparatus from a prior art apparatus satisfying the claimed structural limitations.

In regard to claim 3, the recitation "microstructured means includes means for modifying the intensity, polarization, or spectrum of emitted light" has not been given patentable weight because is considered an intended used recitation. It has been held that a recitation with respect to the manner in which a claimed apparatus is intended to be employed does not differentiate the claimed apparatus from a prior art apparatus satisfying the claimed structural limitations.

In regard to claim 4, the Barnes reference discloses that the microstructured means is generally lateral and parallel to the semi-conductor layer (Figure 5).

In regard to claim 5, the recitation "means includes means for controlling the polarization state of emitted radiation" has not been given patentable weight because is considered an intended used recitation. It has been held that a recitation with respect to the manner in which a claimed apparatus is intended to be employed does not differentiate the claimed apparatus from a prior art apparatus satisfying the claimed structural limitations.

In regard to claim 6, the recitation "means includes means for controlling the frequency of radiation emitted in a given direction" has not been given patentable weight because is considered an intended used recitation. It has been held that a recitation with respect to the manner in which a claimed apparatus is intended to be employed does not differentiate the claimed apparatus from a prior art apparatus satisfying the claimed structural limitations.

In regard to claim 7, the Barnes reference discloses an LED with a periodic microstructured feature, but it does not disclose many regions of different periodicity. However, it is noted that the inclusion of different regions of periodicity is not shown to solve any problems or yield any unexpected results that are not within the scope of Barnes's LED. Accordingly, the inclusion of different regions of periodicity is considered to be an obvious matter of design choice.

In regard to claim 8, the recitation "configured in conjunction with the photonic band-structure of the LED to allow for the preferential excitation of one or more desired wave guide modes" has not been given patentable weight because is considered an intended used recitation. It has been held that a recitation with respect to the manner in which a claimed apparatus is intended to be employed does not differentiate the claimed apparatus from a prior art apparatus satisfying the claimed structural limitations.

In regard to claim 9, the Barnes reference discloses an LED with a microstructured feature, but it does not specify the microscopic scale. However, it is noted that the determination of such a scale is not shown to solve any problems or yield any unexpected results that are not within the scope of Barnes's LED. Accordingly, the determination of such the microscopic scale is considered to be an obvious matter of design choice and could be determined by one skilled in the art through experimentation.

In regard to claim 10, the Barnes reference discloses that an LED has a light (radiation) emitting substance usually in the form of a thin film (Page 1, Lines 5-6)

In regard to claim 11, the Barnes reference discloses that the microstructured means is solid and the layer is continuous (Figure 5).

In regard to claim 12, the Barnes reference discloses that the microstructured means provides the entirety of the microstructured layer (Figure 5).

In regard to claim 13, the Barnes reference discloses that the microstructured means is a surface with many parallel grooves in it (a diffraction grating) (Figure 5).

In regard to claim 14, the Barnes reference discloses that the microstructured means is made of an array of opposed projecting portions (Figure 5).

In regard to claims 15 and 16, the Barnes reference discloses an LED with a microstructured feature, but it does not specify the depth between the peaks and troughs. However, it is noted that the determination of such a depth is not shown to solve any problems or yield any unexpected results that are not within the scope of Barnes's LED. Accordingly, the determination of such the depth between the peaks and troughs is considered to be an obvious matter of design choice and could be determined by one skilled in the art through experimentation.

In regard to claim 17, the Barnes reference discloses that the corrugation is in the entirety of the layer (Figure 5).

In regard to claim 20, the Barnes reference discloses the use of a light emitting layer but does not specify the material. It is well known in the art to use an organic material for the luminescent layer of an LED.

In regard to claim 21, the Barnes reference discloses that the light emitting layer is a conjugated polymeric material (Figure 5).

In regard to claim 22, the Barnes reference discloses the use of a light emitting layer but does not specify the material. It is well known in the art to use an inorganic material for the luminescent layer of an LED.

In regard to claim 25, the Barnes reference discloses the method for production of an LED, where a laminar structure is fabricated comprising one or more semiconductor layers and a periodic microstructured feature adapted to manipulate emission or propagation of light (Figure 5 and Page 2, Lines 21-25). Because the LED has a sequence of layers on a substrate (Figure 5), the LED must have two electrodes, one adapted for electron injection and one adapted for hole injection, sandwiching the layer structure.

In regard to claim 26, the Barnes reference discloses the use of a light emitting layer but does not specify the material. It is well known in the art to use an organic material for the luminescent layer of an LED. The semi-conducting layer has lateral periodic microstructured features of a suitable period to facilitate coupling.

The recitation "at least in some part to useful far-field radiation so recovering some of the energy that would otherwise have been lost to non-radiative waveguide-modes" has not been given patentable weight because is considered an intended used recitation. It has been held that a recitation with respect to the manner in which a claimed apparatus is intended to be employed does not differentiate the claimed apparatus from a prior art apparatus satisfying the claimed structural limitations.

In regard to claim 28, the Barnes reference discloses that the microstructured feature is produced by photo-lithography (Page 3, Lines 24-25).

In regard to claim 29, the Barnes reference discloses that an interferometer is used to fabricate the substrate (Page 4, Lines 7-9).

In regard to claim 30, the Barnes reference discloses that the microstructure is transferred from the photoresist layer to the substrate (Page 10, Lines 25-32).

4. Claims 1, 18, and 19 are rejected under 35 U.S.C. 103(a) as being unpatentable over Joannopoulos et al. (WO 98/25314).

In regard to claim 1, the Joannopoulos reference discloses an LED (Figures 6 and Page 13, Line 35- Page 14, Line 32) with a semiconductor layer (Figure 6, Element 620) and a periodic microstructured means (Figure 6, Element 608). Because the LED has a sequence of layers on a substrate (Figure 6), the LED must have two electrodes, one adapted for electron injection and one adapted for hole injection, sandwiching the layer structure.

In regard to claim 18, the Joannopoulos reference discloses that the microstructured means comprises areas of modified refractive index (Page 7, Lines 21-36).

In regard to claim 19, the Joannopoulos reference discloses that the portions of the layer with the modified refractive index are in the form of areas laterally across the layer (Figure 6 and Page 7, Line 21- Page 8, Line 10).

5. Claim 27 is rejected under 35 U.S.C. 103(a) as being unpatentable over Barnes et al. (WO 98/25313) in view of Ueda et al. (USPN 6,060,826).

All the limitations of claims 25 and 26 have been met in the rejection under Barnes above.

In regard to claim 27, the Barnes reference discloses a semi-conducting layer but does not specify how the layer is coated. The Ueda reference teaches that the organic luminescent layer

may be formed by spin-coating or dip-coating (Column 7, Lines 22-29). It would have been obvious to one of ordinary skill in the art at the time the invention was made to form the organic layer by spin-coating or dip-coating, as taught by Ueda.

Allowable Subject Matter

6. Claims 33-34 are allowed.

7. The following is an examiner's statement of reasons for allowance:

Regarding claim 33, the references of the Prior Art of record fails to teach or suggest the combination of the limitations as set forth in claim 33, and specifically comprising the limitation that an LED has a plurality of layers overlying the silica substrate where one of the layers is a corrugated photoresist and another includes a periodic microstructure.

Regarding claim 34, claim 34 is allowable for the reasons given in claim 33 because of its dependency status from claim 33.

Conclusion

8. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period

will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Response to Arguments

9. Applicant's arguments filed 11/26/03 have been fully considered but they are not persuasive.

Regarding applicants claim that the limitation "means for manipulating" in claim 1 should now be examined, the examiner respectfully disagrees. The limitations "periodic microstructured means" is considered to be a structural limitation and is given patentable weight. The phrase "means for manipulating" does not meet the requirements of 112 6th paragraph and is not given patentable weight. Therefore, it is believed that the rejections by Barnes and Joannopoulos meet all of the structural limitations of the claims.

Contact Information

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Holly Harper whose telephone number is (571) 272-2453. The examiner can normally be reached on Monday-Friday from 8:30 AM to 5:00 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Nimesh Patel, can be reached on (571) 272-2457. The fax phone number for the organization where this application or proceeding is assigned is (703) 308-7382.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 308-0956.

Holly Harper
Patent Examiner
Art Unit 2879

VIP PATEL
PRIMARY EXAMINER